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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/534,550	03/27/2000	Shau-Lin Shue	TS97-232B	4337

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EXAMINER

OWENS, DOUGLAS W

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 09/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/534,550

Applicant(s)

SHUE ET AL.

Examiner

Douglas W Owens

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 19 – 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,407,420 to Yamanaka et al. in view of US Patent No. 5,656,529 to Fukase.

Regarding claim 19, Yamanaka et al. teaches a cylindrical shaped capacitor structure (Fig. 45), comprising:

a bottom polysilicon shape (bottom portion of 415) on a first section of an underlying insulator layer (414), wherein the bottom polysilicon shape overlies and contacts a plug disposed in an opening in the insulator layer;

a capacitor dielectric layer (416) and an upper plate electrode (417); and

vertical conductive polysilicon shapes (upper portion of 415) on a second section of the underlying insulator layer and adjacent the bottom polysilicon shape.

Yamanaka et al. does not explicitly teach uniformly doped polysilicon shapes, such as a polysilicon layer that is insitu doped. Yamanaka et al. teaches that the polysilicon is used as a capacitor electrode, which must be conductive. Since the polysilicon film is conductive, it is obviously doped. Yamanaka et al. is silent with respect to how the polysilicon film is doped. However, Yamanaka et al. does not teach

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performing an implant step after depositing the polysilicon layer. It can be reasonably assumed that the polysilicon layer is doped before or during deposition since it is implied that the film is conductive when deposited. Insitu doping is one known method of doping polysilicon during deposition. One of ordinary skill in the art would have been required to select a known method of doping the polysilicon, such as insitu doping. An insitu doped polysilicon layer would have inherently been uniformly doped. Additionally, insitu doping would not have required an additional step be performed (an implant step), which would have helped keep the cost of manufacture to a minimum.

Yamanaka et al. does not teach an agglomerated metal silicide layer on the exposed portions of the cylindrical polysilicon shape. Fukase teaches a lower electrode for a capacitor having an agglomerated metal silicide layer (8') on the lower electrode. It would have been obvious to one of ordinary skill in the art to incorporate the teaching of Fukase into the device taught by Iwasaki since it is desirable to increase the effective surface area of capacitor electrodes, resulting in greater capacitance. It would have also been obvious to cover all exposed surfaces of the lower electrode with the agglomerated metal silicide layer in order to achieve the maximum benefit.

Regarding claim 20, Yamanaka et al. teaches a capacitor structure, wherein the silicon layer comprises vertical polysilicon shapes connected by a horizontal polysilicon shape.

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Regarding claim 21, neither Yamanaka et al. nor Fukase teach a semiconductor device, wherein the silicide layer comprises titanium silicide, cobalt silicide, nickel silicide or platinum silicide. Fukase teaches a semiconductor device, wherein the metal silicide is tungsten silicide or other refractory silicide layers (Col. 6, lines 65-67). Fukase does not explicitly teach a silicide layer chosen from the group consisting of titanium silicide, cobalt silicide, nickel silicide, and platinum silicide. It would have been obvious to one of ordinary skill in the art to select a silicide from the cited group since they are known metal silicides and well suited for the intended use.

Response to Arguments

3. Applicant's arguments filed June 20, 2003 have been fully considered but they are not persuasive.

4. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Fukase teaches that the layer of roughened (agglomerated) silicide can be used to increase the effective surface area of a capacitor electrode. Fukase further discloses that the silicide is formed on the exposed surfaces of the lower electrode. One having ordinary skill in the art would have been motivated to form the roughened silicide layer taught by Fukase on the lower electrode taught by Yamanaka et al., since the effective surface area can be increased in this manner. Maximum benefit would have been

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achieved by forming the roughened silicide on all exposed surfaces of the lower electrode.

5. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the agglomerated material being located **only** on all surfaces of the cylindrical structure and not on any other surface) are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO


TOM THOMAS
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